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MALARIA IN NORTH CAROLINA.

PREVALENCE AND GEOGRAPHIC DISTRIBUTION.

August 1, 1913, the periodical circularization of the physicians of North Carolina was begun to determine the prevalence and geographic

U. S. MARINE HOSPITAL, NEW ORLEANS, LA.

DEAR DOCTOR: The United States Public Health Service has undertaken to collect information of the prevalence and geographic distribution of malarial fevers in the United States. In order to obtain such information, this form of postal card, which requires no stamp, has been prepared for your reply.

Your report will be of value whether you have had cases or not. In every instance, please fill in your post-office address, county, and State, with your signature, as all data thus furnished will be tabulated and used in a report on the prevalence and geographic distribution of malarial fevers in your State.

Please keep a record of your cases of malaria, as postal cards will be sent you every quarter.

Thanking you for your cooperation, I remain,

Respectfully,

R. H. VON EZDORF, Surgeon, U. S. P. H. S.

.....
(Post office.)

.....
(County.)

.....
(State.)

.....
(Date.)

The following numbers of new cases of malarial fevers occurred in my practice during the months named, of the year 1915:

JULY.		AUGUST.		SEPTEMBER.	
White.	Colored.	White.	Colored.	White.	Colored.

The diagnoses were confirmed by the use of the microscope in of these cases.

NOTE.—Any additional information bearing on malarial fevers, their types, the kind of mosquitoes in the locality, the presence of breeding places of mosquitoes, prophylactic measures, chronic malaria, proportion of children affected, and hæmoglobinuric fevers, should be stated under remarks.

Remarks:
.....
.....
.....

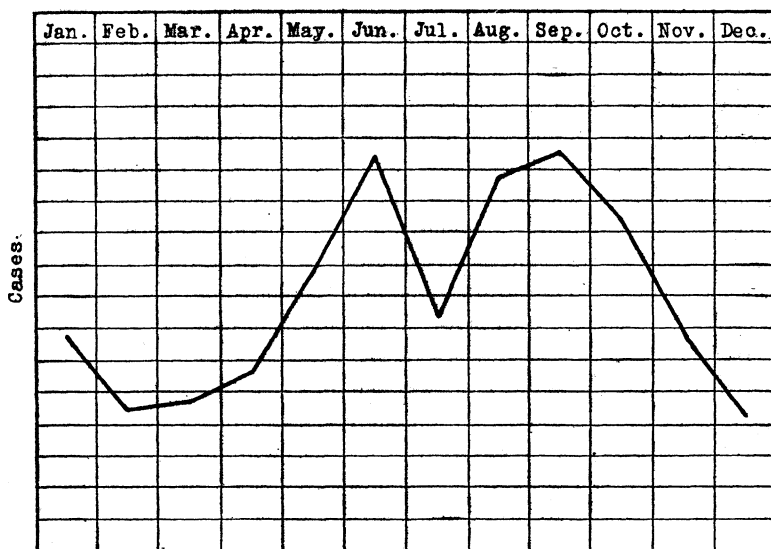
....., M. D.

Reproduction of reply postal card.

distribution of malaria infection in the State. This was a continuation of the work which had been begun more than two years before

with the State of Alabama, and which had been carried out in the meantime in a number of other States. At regular intervals reply postal cards were sent to the practicing physicians in North Carolina. These cards were at first sent out each month. During 1915 and 1916 they were sent out quarterly. A reproduction of the card used in 1915 and 1916 is given on page 1128, showing the instructions sent to each physician and the schedule which he was requested to fill out and return.

The work of circularization and of compilation of the data on the returned cards was carried on by the late Surg. R. H. von Ezdorf up to the time of his death in September, 1916. Since then it has been carried on by Asst. Surg. Derivaux and Asst. Surg. Gen. Carter.



Relative prevalence of malaria in North Carolina, by months, as indicated by the numbers of cases reported.

The collection of data by circularization of physicians is not entirely satisfactory in the results it gives. Only about 16 per cent of the physicians fill out the schedules and return them. It is impossible to know the controlling reasons why these 16 per cent return the blanks and 84 per cent fail to do so. One is likely to wonder whether the 16 per cent represent the more capable and conscientious physicians. It is probable that they do and that the replies represent the information of the better practitioners. The number of cards sent out and numbers of schedules returned, and the other results of the circularization, are shown briefly in Table 1.

The results of circularization in this way, depending as they do upon voluntary cooperation of the physicians, do not show the actual number of cases of the disease that occur. The method, however, is dependable and furnishes quite satisfactory information regarding

the geographic distribution of the disease. The replies from the various localities also serve as a convenient and sufficiently accurate index of the relative prevalence of malarial fevers. The data returned by the physicians are probably as dependable an index of the relative prevalence of malaria in the several counties as are the mortality records which it has been customary to use as an index of the relative prevalence of typhoid fever and other diseases.

The numbers of cases reported by months for the entire State are given in Table 2, the cases reported by counties in Table 3, the types of infection reported to have been diagnosed microscopically in Table 4, and the counties in which hemoglobinuric fever was reported in Table 5.

The map on page 1129 shows the relative prevalence of the disease in the several counties, the heaviest shaded counties being those in which the infection is heaviest, the unshaded those in which the infection is lightest. The relative density of infection was determined by ascertaining the number of cases reported in each county from August 1, 1913, to December 31, 1916, per 1,000 population. The population used was that of the 1910 census.

It will be noticed in Table 4 that tertian infection was reported as having been diagnosed microscopically in 57 counties, quartan in 18 counties, and estivo-autumnal in 34 counties. Hemoglobinuric fever was reported in 4 counties, namely, Johnston, Martin, Person, and Bertie.

TABLE 1.—Results of circularization of practicing physicians.

Period.	Inquiry cards sent to physicians.	Replies received.	Percentage of replies.	Counties represented in replies.	Counties not heard from.	Cases of malaria reported.
1913.						
August to November.....	1,849	408	22.07	.....	.....	¹ 3,901
1914.						
January to December.....	21,126	3,320	15.72	.....	.....	8,357
1915.						
January to March.....	5,547	780	14.06	91	9	820
April to June.....	1,849	268	14.49	79	21	1,144
July to September.....	1,849	331	17.90	87	13	2,644
October to December.....	1,849	380	20.55	90	10	1,844
1916.						
January to March.....	1,849	300	16.24	83	17	465
April to June.....	1,849	304	16.45	79	21	1,363
July to September.....	1,849	220	11.89	67	33	1,524
October to December.....	1,849	266	14.46	86	14	1,081

¹ Includes 500 cases estimated.

TABLE 2.—Cases of malaria reported by months.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1913.....								11,031	11,160	1,783	1,427	.....
1914.....	867	579	476	619	1,004	1,260	444	1,056	678	635	425	314
1915.....	351	205	264	228	350	566	662	797	1,185	889	653	302
1916.....	139	125	201	280	434	649	373	502	649	554	292	235

¹ 500 additional cases estimated; not distributed by months.

TABLE 3.—Cases reported by counties, by years, and by color.

County.	Aug. 1 to Nov. 30, 1913.			Calendar year 1914.			Calendar year 1915.			Calendar year 1916.		
	White.	Colored.	Combined.	White.	Colored.	Combined.	White.	Colored.	Combined.	White.	Colored.	Combined.
Alamance.....	64	26	90	111	30	141	91	24	115	36	11	47
Alexander.....							4		4	2		2
Alleghany.....	3		3				6		6			
Anson.....	100	97	197	111	64	175	132	71	203	54	30	84
Ashe.....										2	7	9
Avery.....	2		2	7		7	1		1	3		3
Beaufort.....				589	355	944	420	363	783	189	150	339
Bertie.....				184	162	346	1	3	4	35	32	67
Bladen.....				119	25	144	113	66	179	26	18	44
Brunswick.....				12	3	15						
Buncombe.....	46		46	14		14	1		1	10		10
Burke.....	13		13	13	1	14	7		7	3		3
Cabarrus.....	91	6	97	108	42	150	53	45	98	95	40	135
Caldwell.....				3		3						
Camden.....				29	18	47	19	27	46	18	17	35
Carteret.....				108	46	154	55	15	70	46	8	54
Caswell.....							1	3	4	2	1	3
Catawba.....	10		10	40	4	44	70	21	91	32	11	43
Chatham.....	42	19	61	120	18	138	21	7	28	6		6
Cherokee.....	1		1	1		1				3		3
Chowan.....				72	9	81						
Clay.....												
Cleveland.....	68	8	76	125	25	150	38	19	57	112	27	139
Columbus.....				48	11	59				6	6	12
Craven.....				33	7	40	29	3	32	23	4	27
Cumberland.....	49	1	50	70	28	98	50	28	78	47	35	82
Currituck.....				83	52	135	51	54	105	44	34	78
Dare.....				13	8	21						
Davidson.....	73	30	103	50	10	60	43	10	53	22	12	34
Davie.....	5	5	10	29	2	31	6		6	9		9
Duplin.....				47	37	84	27	31	58	2	3	5
Durham.....	172	56	228	133	16	149	54	13	67	213	27	240
Edgecombe.....				164	78	242	37	16	53	18	7	25
Forsyth.....	67	9	76	61	5	66	40	8	48	12	1	13
Franklin.....				85	27	112	68	12	80	78	11	89
Gaston.....	73	44	117	98	24	122	51	7	58	8	8	16
Gates.....				20	15	35	16	9	25			
Graham.....				21		21	10		10	6		6
Granville.....				48	45	93	45	12	57	45	11	56
Greene.....				25	5	30	9	2	11	34	8	42
Guilford.....	354	71	425	178	41	219	100	19	119	243	48	291
Halifax.....			1 500	103	92	195	118	71	189	19	23	47
Harnett.....	60	2	62	38	18	56	28	18	46	21	12	33
Haywood.....		1	1	8		8				11		11
Henderson.....	10		10	7		7	4	1	5	1		1
Hertford.....				51	30	81	22	34	56			
Hoke.....				9	6	15	3		3	2		2
Hyde.....				9	2	11	9	2	11	5	7	12
Iredell.....	44	18	62	82	14	96	127	1	128	29	7	36
Jackson.....												
Johnston.....	75	17	92	202	36	238	51	22	73	21	28	49
Jones.....							9	4	13			
Lee.....				22	10	32	11	8	19	3		3
Lenoir.....				44	21	65	75	48	123	13	55	68
Lincoln.....	36	4	40	39		39	2		2	5	1	6
McDowell.....				3		3	2		2	3		3
Macon.....							2		2			
Madison.....												
Martin.....				61	32	93	136	58	194	50	28	78
Mecklenburg.....	79	40	119	78	38	116	39	19	58	31	16	47
Mitchell.....							1		1	1		1
Montgomery.....	36	57	93	19	20	39	11		11	32	8	40
Moore.....	4		4	14	5	19	12		12	4		4
Nash.....				45	23	68	45	35	80	24	5	29
New Hanover.....				37		37	13	1	14	7	1	8
Northampton.....				89	87	176	89	67	156	59	97	156
Onslow.....				35	8	43	38	10	48	17	3	20
Orange.....	22		22	33	7	40	34	8	42	35	17	52
Pamlico.....				12	3	15	1		1	5	1	6
Pasquotank.....				60	86	146	28		28	44	5	49
Pender.....				1		1						
Perquimans.....				133	92	225	24	49	78	25	43	68
Person.....	79	8	87	24	4	28	81	8	89	179	63	242

1 Estimated; color not stated.

TABLE 3.—Cases reported by counties, by years, and by color—Continued.

County.	Aug. 1 to Nov. 30, 1913.			Calendar year 1914.			Calendar year 1915.			Calendar year 1916.		
	White.	Colored.	Combined.	White.	Colored.	Combined.	White.	Colored.	Combined.	White.	Colored.	Combined.
Pitt.				499	386	885	541	264	805	195	74	269
Polk.	5		5				2		2			
Randolph.	95	26	121	65	7	72	40	6	46	71	2	73
Richmond.	3		3	23	1	24	43		43			
Robeson.				62	18	80	78	30	108	18	1	19
Rockingham.	62	12	74	44	13	57	22	19	41	56	48	104
Rowan.	198	49	247	71	15	86	62	22	84	24	14	38
Rutherford.	1	2	3	4	3	7				1		1
Sampson.				50	18	68	31	14	45	45	15	60
Scotland.				35	8	43	14	8	22	12	8	20
Stanly.	27	18	45	39	31	70	17	17	34	41	16	57
Stokes.	28	34	62	11		11	35	18	53	20	13	33
Surry.				1	1	2				3		3
Swain.												
Transylvania.	1		1	4		4	20	19	39			
Tyrrell.				40	18	58	167	181	348	18	6	24
Union.	34	1	35	59	7	66	37	6	43	33	29	62
Yancey.				29	3	32	11	25	36	57	19	76
Wake.	58	44	102	270	102	372	219	65	284	176	102	278
Washington.				45	31	76	13	3	16			
Watauga.				9	4	13	33	49	82	25	37	62
Wayne.	54	65	119	57	49	106	44	39	83	37	29	66
Wilkes.	12		12	11		11	12	2	14	13		13
Wilson.	163	160	323	49	34	83	85	51	136	19	5	24
Yadkin.	40	12	52	47	3	50	41	10	51	21	3	24
Yancey.				4		4	1		1	4	1	5
Total.	2,459	942	3,401	5,758	2,599	8,357	4,252	2,200	6,452	3,019	1,414	4,433

¹ Includes 596 cases estimated; color not stated.

TABLE 4.—Types of infection reported diagnosed microscopically, by counties.

County.	Tertian.		Quartan.		Estivo-autumnal.	
	August-November, 1913.	January-September, 1914.	August-November, 1913.	January-September, 1914.	August-November, 1913.	January-September, 1914.
Alamance.	1	5		2	+	+
Alleghany.	1					
Anson.	44	66	1		6	6
Avery.	+	3				
Beaufort.		+		+		14
Bertie.				+		14
Bladen.		17		6		4
Brunswick.		2		+		+
Buncombe.	22	4	+		9	1
Burke.	+	+	+	+		
Cabarrus.	+	14	+	+	+	
Caldwell.		+				
Camden.	+	+		+		+
Carteret.		17				
Catawba.	1	6	1	+	+	1
Chatham.	3	19	+	+	+	
Cherokee.	+	+				
Chowan.		29		2		3
Cleveland.		5		+		2
Columbus.		8		+		+
Craven.		2				+
Cumberland.	12	21		+	4	7
Currituck.		7		+		1
Dare.		1				
Davidson.	1	3	+	2	+	1
Davie.	+	+		+		+
Duplin.		+				+
Durham.		3	+	+	+	+
Edgecombe.	+	9		2		+

The figures indicate the numbers of cases reported diagnosed microscopically. The sign + indicates that cases were reported, but the diagnosis was not confirmed by the microscope. This information was collected during the years 1913 and 1914 only.

TABLE 4.—Types of infection reported diagnosed microscopically, by counties—Contd

County.	Tertian.		Quartan.		Estivo-autumnal.	
	August-November, 1913.	January-September, 1914.	August-November, 1913.	January-September, 1914.	August-November, 1913.	January-September, 1914.
Forsyth.....	15	16	3	+	.....	3
Franklin.....	.....	18	.....	+	.....	.....
Gaston.....	3	3	+	2	+	1
Gates.....	.....	+	.....	.....	.....	.....
Graham.....	.....	4	.....	1	.....	.....
Granville.....	.....	10	.....	+	.....	+
Greene.....	.....	+	.....	.....	.....	.....
Guilford.....	83	8	5	1	15	10
Halifax.....	+	4	+	+	+	1
Harnett.....	2	6	.....	.....	.....	13
Haywood.....	+	+	.....	.....	.....	.....
Henderson.....	10	.....	.....	+	.....	.....
Hertford.....	.....	+	.....	+	.....	.....
Hoke.....	.....	.....	.....	.....	.....	3
Hyde.....	.....	+	.....	+	.....	+
Iredell.....	8	5	.....	+	.....	+
Johnston.....	4	38	+	11	1	10
Lee.....	.....	1	.....	.....	.....	+
Lenoir.....	.....	4	.....	+	.....	2
Lincoln.....	+	6	+	+	1	+
McDowell.....	.....	1	.....	.....	.....	.....
Martin.....	.....	+	.....	+	.....	+
Mecklenburg.....	16	15	.....	+	2	+
Montgomery.....	.....	.....	.....	.....	3	1
Moore.....	1	+	.....	1	.....	.....
Nash.....	.....	13	.....	.....	.....	+
New Hanover.....	.....	1	.....	+	.....	+
Northampton.....	.....	+	.....	.....	.....	+
Onslow.....	.....	+	.....	+	.....	2
Orange.....	14	4	.....	+	3	+
Pamlico.....	.....	+	.....	.....	.....	+
Pasquotank.....	.....	+	.....	+	.....	+
Perquimans.....	.....	+	.....	+	.....	+
Person.....	+	1	.....	+	.....	.....
Pitt.....	.....	33	.....	3	.....	4
Polk.....	+	.....	.....	.....	.....	.....
Randolph.....	+	3	+	.....	.....	+
Richmond.....	2	+	.....	+	.....	.....
Robeson.....	.....	10	.....	+	.....	1
Rockingham.....	6	5	+	+	2	+
Rowan.....	10	2	+	+	12	.....
Rutherford.....	+	+	.....	.....	.....	+
Sampson.....	.....	6	.....	2	.....	+
Scotland.....	.....	+	.....	3	.....	+
Stanly.....	+	3	+	+	+	+
Stokes.....	.....	1	.....	.....	.....	.....
Surry.....	.....	.....	.....	.....	.....	1
Transylvania.....	.....	.....	.....	.....	1	.....
Tyrrell.....	.....	+	.....	+	.....	+
Union.....	9	2	+	+	3	+
Vance.....	.....	+	.....	.....	.....	+
Wake.....	+	14	+	1	+	7
Warren.....	.....	2	.....	+	.....	+
Washington.....	.....	+	.....	.....	.....	.....
Wayne.....	+	5	+	+	+	3
Wilkes.....	.....	+	.....	+	.....	.....
Wilson.....	13	25	12	5	7	+
Yadkin.....	+	+	+	.....	+	.....
Yancey.....	.....	+	.....	.....	.....	.....
Total.....	286	514	22	44	69	116

The figures indicate the numbers of cases reported diagnosed microscopically. The sign + indicates that cases were reported, but the diagnosis was not confirmed by the microscope. This information was collected during the years 1913 and 1914 only.

TABLE 5.—Hemoglobinuric fever reported, 1916.

County.	Period.	Cases.
Johnston.....	Second quarter.....	1
Martin.....	Third quarter.....	2
Person.....	Third quarter.....	1
Bertie.....	Fourth quarter.....	1